The American STATISTICIAN

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The American STATISTICIAN

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THE NATIONAL SCIENCE FOUNDATION BILL

IT'S LATE BUT NOT TOO LATE. President Truman's pocket veto of the National Science Foundation Bill has given American statisticians and social scientists another opportunity to help correct major weaknesses of the bill.

There has been much controversy over the administrative characteristics of the N. S. F. bill passed by the 80th Congress. In fact, it was the administrative weaknesses which led the President not to sign the bill. The fact that it might have been an administrative monstrosity and completely at odds with the American democratic system of checks and balances is of great importance. This weakness should be corrected in any subsequent bill. Of greater importance to scientists, however, is the failure of the bill to include all sciences. Statistics as an important method for all sciences—natural, physical, and social—was not included, nor was there any provision for inclusion of any of the social sciences. This fact presents an interesting, if not conflicting, anomaly for statistics. Statistics—the tool of all sciences—has to a great extent not been utilized by the natural and physical sciences. During the war great strides were made in increasing the use of statistics, at least in certain aspects of the physical sciences, and it is true, of course, that certain specialists in biological fields have not only been extensive users, but originators and initiators of statistical method. For these very small parts of the natural sciences, however, statistics has been too much taken for granted and has not been given the place in scientific considerations which would guarantee its inclusion, both for training and development, in an over-all approach to general scientific development as envisaged in a National Science Foundation.

The social sciences, on the other hand, since World War I, have increasingly made statistics the major tool of their profession. This has occurred to such an extent that statistics has frequently been classed as one of the social sciences. As such, it was naturally not included in the bill, since the social sciences themselves were not included. They were actually excluded from the Kilgore bill, which was presented to the 79th Congress. The fact that statistics should be excluded from the benefits of a bill because of the neglect of one scientific group and the adoption by another puts the statisticians in a special category and gives them a particular responsibility with respect to their future part in a National Science Foundation.

Every American statistician, every social scientist as well as every worker in the fields of the physical and natural sciences who uses statistics professionally, has an individual responsibility to make these points clear to his representatives in the House and the Senate. Unless he does this and, in addition, urges prompt action, he will have failed in the acceptance of the responsibilities of a mature scientist in a democratic nation.

The need for an over-all approach is recognized in the following recommendations in the report to the President by John R. Steelman, Chairman of The President's Scientific Research Board.

> "It is, therefore, recommended that the Congress be urged to establish at its next session a National Science Foundation within the Executive Office of the President and that the Foundation be authorized to spend $50 million in support of basic research its first year, with increasing amounts thereafter, rising to an annual rate of at least $250 million by 1957. No restrictions should be placed upon the fields of inquiry eligible for support."

THE EDITORS

NEWS

Preliminary program for 107th Annual Meeting of American Statistical Association — 1948 ASA officers nominated — International conferences reported — New international statistical societies formed

THE INTERNATIONAL STATISTICAL CONFERENCES

by ROBERT B. LUCE
Information Officer, International Statistical Conferences

With two solid weeks of accomplishment behind them, statisticians from fifty-five nations have left Washington, D. C., scene of the International Statistical Conferences, to go back to their statistical tasks, refreshed and encouraged by the general excellence of the sessions. Conferences of the ISI have always, in the past, been closed to everyone except members. This is the first Conference at which the technical sessions, some of them held in conjunction with other international statistical societies, were opened to visitors to the limits of the meeting room capacity. Approximately 600 statisticians, more than half of them non-American, participated in 55 separate meetings from September 6–18 in the Shoreham and Wardman Park hotels. Only four nations, the U.S.S.R., Saudi Arabia, Burma and Ethopia declined the invitation to send delegates to the conferences, and there was excellent participation throughout.

The conferences were formally opened September 8 by Trygve Lie, Secretary General of the United Nations. Secretary of Commerce W. Averell Harriman welcomed the delegates on behalf of President Harry S. Truman. Willard L. Thorp, President of the American Statistical Association, Assistant Secretary of State for Economic Affairs and U. S. Representative to the Economic and Social Council of U. N., presided at the opening meeting.

In the welcoming speech, Trygve Lie made a strong plea for international statistical cooperation and increased interchange of information. He commented on the scarcity of statistical information in many parts of the world, asking the assembled statisticians to make all possible haste to fill the gaps in statistical knowledge. Mr. Lie said that the United Nations needs the help of statisticians everywhere, in order to perform its duty as a pillar of world peace.

Secretary of Commerce Harriman pledged the cooperation of the United States in international statistical activities, and pointed out that the United States is always ready to share statistical information with the United Nations and the private statistical organizations.

A message from Truman

The Secretary of Commerce read a message of greeting from the President of the United States: "It is my hope that you men will find the means of binding the world together in arrangements for the collection and free exchange of dependable economic and social information concerning all people. In my opinion, this would do much to promote the growth of peaceful democratic institutions throughout the world."

Walter F. Willcox honored

Walter F. Willcox, the "grand old man" of the American statistical profession, who was elected President of the Washington session of the International Statistical Institute, gave the response to the official welcoming addresses by Harriman and Lie. Dr. Willcox charted, in brief historical outline, the development of the statistical societies represented at the conferences. He pointed out that "all of these organizations spring from a common ancestry and so make one family." He expressed the hope that there would be future international conferences that would "build up that solid basis of verifiable fact and trustworthy interpretation on which policy, both domestic and international, must be based, if it is to be sound and healing."

Conference achievements

There is no doubt that the chief value of the conferences was in bringing together statisticians from many nations, for the first time in nearly a decade, to pool ideas, new developments, and submit new theories to the crossfire of criticism.

Of secondary importance, however, though none the less valuable, was the job of assigning definite functions to each of the private organizations to prevent overlapping between private and official, national or intergovernmental agencies. In order to clarify the world statistical picture, United Nations officials explained in detail the activities of the United Nations Statistical Commission and the Statistical Office of the United Nations. This explanation was followed by a clear presentation of the statistical activities of each organ of the United Nations —the Food and Agriculture Organization, the World Health Organization and the International Bank for Reconstruction and Development, etc.

With this international picture clear in their minds, members of the private societies convened to outline their own roles, with particular reference to the United Nations. The ISI, for example, adopted resolutions defining its position as that of "an international professional society," for the advancement of the science of statistics and as a consultative organization to any official agencies that are in need of advice.

Commenting on this problem, Dr. Stuart A. Rice, speaking for the ISI, said, "The Institute's future must rest upon a voluntary, scientific, and not an official status. It will be close to the national governments and intergovernmental bodies, but beyond their domination. It will serve and abet their efforts toward international statistical progress, but will not exercise their official functions."

1950 Census plans made

The Inter American Statistical Institute's Committee on the 1950 Census of the Americas, in its first formal meetings held preliminary to the opening of the conferences, sketched the outlines of the minimum schedule for the Western Hemispheric Census. It will be the first international population census. The committee has also made plans to participate in the 1950 World Census of Agriculture that is being taken under the auspices of the United Nations Food and Agriculture Organization.

ASA's place in the program

ASA shared the spotlight in the conferences with sessions on sampling theory, sampling practice, and a resume of United States development in economic and social statistics.

The graphic exhibit, arranged by Kenneth W. Haemer, Chairman of the American Statistical Association's Committee on Graphic Presentation, lined both meeting rooms in the Shoreham Hotel.

On the lighter side, the American Statistical Association was the host at one of the largest receptions of the conferences. Mr. and Mrs. Willard L. Thorp headed a receiving line which included Mr. and Mrs. Lester S. Kellogg, Isador Lubin, Helen M. Walker and Aryness Joy Wickens. In the final week of the conferences, the ASA and the Joint Arrangements Committee for the conferences were cosponsors of a luncheon for women delegates.

INTERNATIONAL BIOMETRIC SOCIETY FORMED

A new organization, the Biometric Society, was formed at the first International Biometric Conference, held at Woods Hole, Mass., on September 5 and 6. The conference was arranged by a special organizing committee and was attended by approximately 100 biologists, statisticians, and mathematicians.

The Society will be based on individual memberships without national quotas. As stated in its constitution "The Biometric Society is an international society for the advancement of quantitative biological science through the development of quantitative theories and the application, development and dissemination of effective mathematical and statistical techniques. To this end the Society welcomes to membership biologists, mathematicians, statisticians and others interested in applying similar techniques." The Council governing this Society consists of R. A. Fisher (England), President; T. W. Hopkins (Canada) as Treasurer; and C. I. Bliss (U.S.A.) as Secretary. As of September 6, the other members of the Council are M. Belz (Australia), R. C. Bose (India), D. W. Bronk (U.S.A.), G. M. Cox (U.S.A.), C. Dieulefait (Argentina), J. B. S. Haldane (Great Britain), A. Linder (Switzerland), M. Neurdenburg (Netherlands), G. Rasch (Denmark), G. Teissier (France), J. W. Tukey (U.S.A.) and E. B. Wilson (U.S.A.).

Arrangements have been made to publish the proceedings of the Woods Hole Conference in *Biometrics*, the publication of the Biometrics Section of the American Statistical Association. Anyone joining the Society before February 1, 1948, will be considered a charter member. Further information can be obtained from the Secretary, C. I. Bliss, Box 1106, New Haven, Conn.

AMERICAN STATISTICAL ASSOCIATION PROPOSES 1948 SLATE OF OFFICERS

Presented by the Nominating Committee — Woodlief Thomas, chairman; Gertrude M. Cox; Vergil Reed

President

George W. Snedecor, Iowa State College

Directors 1948–1950

Willard Thorp, Department of State

Frederick F. Stephan, Princeton University

Vice-Presidents

A. Ford Hinrichs, Kiplinger Magazine

Abraham Wald, Columbia University

Rensis Likert,
Survey Research Center,
University of Michigan

Harry R. Wellman,
Giannini Foundation of Agricultural Economics, University of California

National Research News Letter

This Washington Service was recently inaugurated by Graphic Reports, Inc. for the specific purpose of keeping statisticians, economists, and research specialists informed of the precise content of current Government surveys. Editor of the new publication is Michael Fooner, former Government economist and free-lance writer. Address inquiries to the *National Research News Letter,* 303 Woodward Building, Washington, D. C.

Changes in the Monthly Labor Review

Format and organization of contents of the *Monthly Labor Review* were revised effective with the July 1947 issue. The publication now has an 8 × 10 inch page and text is presented in two columns in a larger type than formerly. The change in form was motivated by a desire to create greater clarity and readability, and to facilitate the presentation of both graphic and tabular materials. The physical redesigning was also made the occasion for reorganization of the method of presenting *Monthly Labor Review* contents, the purpose in this instance being to increase the publication's utility both as a reference book and as a review of current labor economics.

"The Labor Month in Review," presenting a summary of developments of interest to labor during the month, is a new feature and appears at the beginning of the periodical. Also all recurring data are contained in the final section, "Current Labor Statistics," which presents a number of innovations. For example, most tables contain monthly data for 13 consecutive months.

The change in format and presentation of the *Monthly Labor Review* involves no change in policy regarding its content.

ILO Sixth International Conference of Labour Statisticians

The Sixth International Conference of Labour Statisticians met in Montreal August 4–12, 1947, and adopted resolutions setting international standards for the compilation and publication of statistics of employment, unemployment and the labour force, cost of living and industrial injuries. It also adopted resolutions proposing certain related topics for the agenda of future sessions of the Conference.

The Conference, which was attended by delegates from 23 countries, by representatives of the Governing Body of the International Labour Office and by representatives of the United Nations, the Food and Agriculture Organisation of the United Nations, the International Civil Aviation Organisation and the International Monetary Fund, was convened on the authority of the Governing Body of the International Labour Office.

The texts of the three principal resolutions adopted by the Conference are published in a pamphlet, "International Standards for Statistics of Employment, Unemployment and the Labour Force, Cost of Living and Industrial Injuries." The various other resolutions adopted by the Conference are summarized and a brief account of the work of previous sessions of the International Conference of Labour Statisticians are also included in this booklet.

Federal Statistical Programs Curtailed for 1948

The reductions in appropriations for Federal agencies for fiscal year 1948 will necessitate many changes in statistical programs. Most new work which was proposed will not be undertaken, and in addition many existing programs (particularly in the Census Bureau and the Bureau of Labor Statistics) have been curtailed.

The December issue of *The American Statistician* will contain a summary article describing the principal changes being made in statistical programs in the current year.

First elections of International Statistical Institute since 1938

Three Honorary Presidents were elected by the International Statistical Institute at the meetings in Washington in September—Armand Julin of Belgium, H. W. Methorst of the Netherlands, and Walter L. Willcox of the United States.

Stuart A. Rice, United States, was elected President of the Institute; Jan Tinbergen, the Netherlands, Secretary-General; Arthur L. Bowley, United Kingdom, Treasurer; and Gunnar Jahn, Norway; P. C. Mahalanobis, India; Jacques Rueff, France; and E. Szturm de Sztrem, Poland—Vice Presidents.

The ISI membership was increased by seven, when the following outstanding statisticians were honored by election: J. P. Fontanelle, Brazil; E. A. Goldenweiser, United States; H. A. Innes, Canada; Isador Lubin, United States; E. A. Saari, Finland; A. Sauvy, France; and F. Yates, United Kingdom.

International Association for Research in Income and Wealth Organized

This association was formed at the Washington Conferences of the International Statistical Institute to promote and coordinate studies of national income and national wealth. The Association Council, under the Chairmanship of Simon Kuznets (United States), includes some of the outstanding economists and statisticians in this field. The Council membership comprises: Simon Kuznets, Chairman; Colin Clark, Australia; J. B. D. Derksen, The Netherlands; Milton Gilbert, United States; E. F. Lundberg, Sweden; François Perroux, France; V. K. R. V. Rao, India; J. Richard Stone, England; and Jan Tinbergen, The Netherlands.

International Union for the Scientific Study of Population adopts new constitution

The Union was reorganized at its meeting held in conjunction with the International Statistical Conferences on the basis of individual member, rather than national committee participation. The members in various countries are privileged to form national committees. A. Landry, France, was reelected President of the Union, and George Mauco, France, was reelected Secretary-Treasurer.

The Vice Presidents elected were: L. Boldrini, Italy; Ta Chen, China; David V. Glass, United Kingdom; Liebman Hersch, Switzerland; A. J. Lotka, United States; Alberto Arca Parró, Peru; Stefan Szulc, Poland.

107th Annual Meeting

New York City, December 28-30, 1947, Hotel Commodore

The Program Committee of the American Statistical Association has announced a provisional and partial program of the 1947 annual meeting of the American Statistical Association. Titles and names of speakers will be available shortly and are to be published in the December issue of *The American Statistician.*

In addition to the topics listed below, the Association is planning an extensive program dealing with the applications of statistics in the field of economics. Joint sessions, the content of which has not yet been made public, are to be held with the Institute of Mathematical Statistics.

New Developments:	New statistical findings in 1947
Economics:	Economic outlook for 1948 Problems and needs of statistics for international comparisons The Federal statistical program for 1949 Committee on Census Enumeration Areas Statistical problems in highway planning
Social Sciences:	Measurement theory with special reference to social psychology General methods in sociology Experimental social psychology Public opinion
Biometrics:	Local vital statistics problems Statistical techniques used by life insurance companies Contributed papers
The Physical Sciences:	Statistical application in the sciences
Teaching and Presentation:	Prospects for employment in the statistical profession Visual aids and other methods of presenting statistics Reports on the training of statisticians The introductory course in statistics Student chapters and statistical education
Military:	Use of statistics in military operations analysis
Business:	Practical problems in marketing Technical problems in marketing
General:	Presidential address Annual business meeting Contributed papers

Biometrics Section meets in December

The Biometrics Section will meet in New York with the American Statistical Association, December 28–30, and with the American Association for the Advancement of Science in Chicago, December 26–28. The Annual Business Meeting of the Section will be held in New York and will be followed immediately by a meeting of the Eastern North American Region of the Biometrics Society. New York sessions will include a program on Vital Statistics, Chicago meetings will include one on Mathematical Biophysics and one on Weather Effects on Crops. Details will be given later. Sessions devoted to contributed papers are planned for both meetings. Persons wishing to participate in sessions of contributed papers should notify D. B. DeLury, Ontario Research Foundation, 43 Queen's Park, Toronto 5, Canada.

New Standards Approved in France

The French Standardization Association (Association Francaise de Normalisation) has issued two new standards: *Terminology of Statistics* (NF X 05–001) and *Terminology of Calculation of Probability* (NF X 05–002). Copies may be obtained from the Association at 19, rue du 4-Septembre, Paris-2e, France.

Statistical Analysis with Hand Punched and Sorted Cards

by ALBERT EPSTEIN
Statistician, International Association of Machinists

During the past few years and especially during and since the war, the use of punched cards has become more and more popular as a tool of the business man, the accountant, the statistician, and members of the other professions. To many, the term "punched card" implies analysis on a vast scale by complicated and expensive mechanisms. From the statisticians' standpoint, however, the job of assembling, distributing, tabulating, analyzing and disseminating statistical information does not always justify the use of expensive and complicated equipment. There is a simple tool available to the statistician which will serve many of the same purposes without requiring specially trained personnel or heavy investment.

The International Association of Machinists was faced with the problem of analyzing the 9,000 agreements in its alphabetical file. Since machinists are employed in virtually every industry, it was necessary to find a method of cataloging by specific agreements, so that contracts could be located quickly by type for purposes of analysis. It was decided to use a manually sorted card which is familiar to many veterans as Army Personnel Form 20. These cards may be obtained in many sizes, but the Machinists chose an 8 by 10½ inch card, with 278 holes in two rows along the four edges of the card. The two rows of holes take up about one inch of the card, leaving the entire central portion for a listing of the agreement clauses and for comment.

About 120 items can be coded on the four edges of the card. Coding is performed by punching a V-shaped incision between the hole and the edge of the card. Assume that we wish to find out how many of our agreements have a guaranteed annual wage provision. In the original card punching, hole #57, let us say, was punched in a V-incision for all contracts containing such a clause. In order to answer this question, all that the operator need do is insert a steel needle through hole #57 in all of the cards and then raise the needle. Those cards which do have a guaranteed annual wage provision will remain at the bottom of the alignment box and can then be manually counted. An electric card counter can also be used which will operate at the rate of 40–60,000 cards per hour.

The cards are so designed that by a simple procedure with a single needle, it is possible to arrange any number of cards in numerical or alphabetical sequence. In the case of the IAM, this is particularly useful in sorting for industry classification and company name.

It is obvious that if we want to determine which cards represent contracts containing provisions, A, B and J simultaneously—or any group or number of provisions desired—all that need be done is to insert several needles simultaneously through the appropriate holes. Only those cards with all of the contract provisions chosen will fall to the bottom of the box.

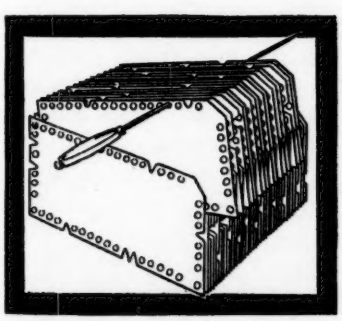
A mechanical multiple selector is available for those who wish to use it.

The marginal sort has many applications and involves an initial expenditure of only a few hundred dollars. This system first came into use in 1933. While the IAM seems to be the first union to make use of the system for indexing and analyzing agreements, the pioneer work was done by the Industrial Relations Section, California Institute of Technology.* The Industrial Relations Section of Princeton University also uses it, but both operate on a relatively small scale.

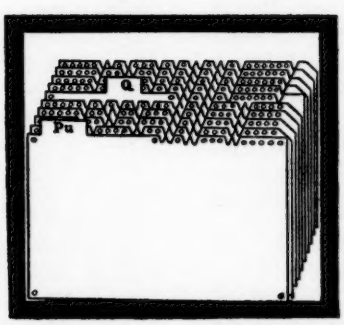
Undoubtedly there are many statisticians who have need for this flexible, versatile and economical tool for statistical tabulation. The writer has used it in the preparation of life-tables of physical property. He has installed it for purposes of agreement analysis as well as union membership. Other statisticians may find the marginal sort card useful for other purposes.

* *Method of Indexing Provisions of Collective Agreements, Bulletin Number 3,* Second Edition, Revised by May E. Jamieson, Research Assistant, Industrial Relations Section, California Institute of Technology. Editor's Note: Another application of the marginal sort card is described in the Bureau of the Census *Handbook of the 1940 Census of Agriculture,* Chap. IV, "Visual Analysis—A Means of Exploration in Statistical Research."

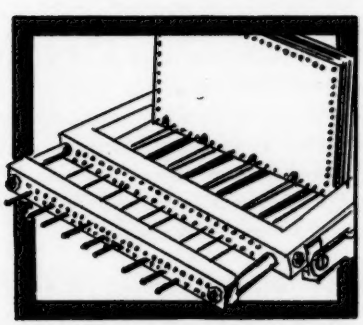
By inserting the steel tumbler in the designated holes and raising, the desired cards are selected.



Proof of sorting and filing is easily obtained by a glance at the grooves along the edges of the sorted cards.



The Selector provides positive selection of several factors without disturbing the order of remaining cards.



Illustrations by courtesy of The McBee Co.

Crisis in Statistical Personnel

Summary of a National Research Council Report*

by S. S. WILKS
Secretary, Committee on Applied Mathematical Statistics, National Research Council

The Committee** on Applied Mathematical Statistics of the National Research Council recently published a report which (1) analyzes some factors contributing to the recent extraordinary growth of interest in the use of statistical methods, (2) presents information on the current and future needs of statistically trained personnel, (3) examines the impact of these needs on present training facilities and (4) indicates some steps which might establish a training program adequate to meet these growing needs.

The formation and recent growth of statistical organizations indicates the increasing interest in statistical methods. The American Statistical Association, founded more than 100 years ago had a membership of 1,700 in 1935. By the end of 1946 it had nearly 4,000 members. The Institute of Mathematical Statistics, formed in 1935 to promote the development of statistical theory, had 900 members by the end of 1946. The Econometric Society with a membership of more than 750 was organized in 1930 to promote the application of mathematics and statistical methods to economics. The Psychometric Society is a similar organization for psychology. It was organized in 1935 and now has about 200 members. The Biometrics Section of the American Statistical Association was formed in 1938 for sponsoring similar work in the biological sciences. It now has more than 1,100 members. The most recent statistical organization is the American Society for Quality Control which is concerned with applications of statistical methods in industry. It was organized early in 1946 and now has approximately 2,000 members, mostly engineers of various kinds. There are other organizations with considerable interest in statistical methods such as the American Marketing Association, American Public Health Association, American Sociological Society and Population Association of America.

Unprecedented demand for statisticians

According to the report, there is a heavy demand for both academic and non-academic statistical personnel. The non-academic fields which account for most of the recent growth of interest in statistical methods are: (1) industrial statistical control (in quality control, research and development), (2) research in the biological sciences, (3) collection and analyses of government statistics, (4) market research and commercial surveys, and (5) psychological testing. The Committee discusses each of these fields in some detail. Demands are continuing and increasing for statistical personnel in some of the older fields such as finance and taxes, labor and employment, prices and production. Demands for more statistical training for social scientists are increasing.

The Committee made an inquiry among 30 leading authorities in mathematical and applied statistics at 27 universities concerning requests received for statistical personnel for a period of approximately six months after the end of the war. These authorities reported a total of 135 requests for personnel for academic positions in mathematical and applied statistics ranging from instructorships to full professorships. No attempt was made to have each respondent identify each request so as to eliminate duplication, but one person reported that he had received requests from 21 college and university mathematics departments for Ph.D.'s in mathematical statistics. Another reported that he had received 12 requests for Ph.D.'s in agronomy with minors in statistics. Ninety requests from government agencies and 140 requests from industry were reported. Training requirements ranged from B.A.'s to Ph.D.'s in mathematical and applied statistics.

A rough comparison may be made of the demands for personnel in mathematics, physics and statistics. As of December 31, 1945, the National Roster of Scientific and Specialized Personnel had registrations of 9,972, 9,608 and 2,018 in mathematics, physics, and

* "Personnel and Training Problems Created by the Recent Growth of Applied Statistics in the United States", by the Committee on Applied Mathematical Statistics, National Research Council, Reprint and Circular Series No. 128, May 1947. 17 pp. Washington, D. C.

** Luther P. Eisenhart, Chairman, Former Chairman, Division of Physical Sciences, National Research Council. Samuel S. Wilks, Secretary, Professor of Mathematical Statistics, Princeton University. Chester I. Bliss, Biometrician, Connecticut Agricultural Experiment Station. Edward U. Condon, Director, National Bureau of Standards. Harold O. Gulliksen, Professor of Psychology, Princeton University. Lowell J. Reed, Vice-President of the University, and Professor of Biostatistics, School of Hygiene and Public Health, The Johns Hopkins University. Charles F. Roos, President, The Econometric Institute, Inc. Walter A. Shewhart, Research Engineer, Bell Telephone Laboratories. Hugh M. Smallwood, Director, Department of Physical Research, General Laboratories, U. S. Rubber Company. Frederick F. Stephan, Professor of Sociology and Statistics, Cornell University.

statistics, respectively. For the period September 1, 1945 to May 31, 1946 the number of requests for personnel in these three fields per 1,000 persons registered was 4.4, 23.9 and 30.7, respectively.

Graduate and undergraduate curricula

The Committee devoted more than a third of its report to problems of education and training in statistics. These problems were discussed at both the undergraduate and the graduate level. It was stated that substantial progress had been made in the teaching of statistics at the graduate level in a number of universities; but that it was still inadequate to meet the growing demands for statistical personnel. Graduate teaching in mathematical statistics is more standardized than that in applied statistics. The Committee listed basic requirements in mathematics for graduate training in mathematical statistics as follows: real and complex variables, linear and quadratic forms, matrix algebra, n-dimensional euclidean geometry, measure and integration theory. The courses are essential for the theory of probability which is the foundation for courses in advanced mathematical statistics covering distribution theory, estimation theory, testing of statistical hypotheses and multivariate statistical theory.

Of the 27 universities included in the Committee's inquiry, only ten claimed a graduate program leading to a Ph.D. degree in mathematical statistics, and fourteen claimed an adequate training program at the advanced level for some field of applied statistics. It was found that only four of the universities have special stipends for graduate work in mathematical statistics. The situation in applied statistics is hardly any more adequate.

In its discussion of the teaching of elementary statistics the Committee emphasized the duplication of material in elementary statistics courses as they are now taught in various departments of a given college or university, as well as the heterogeneity of the quality of teaching. The Committee expressed its opinion that the standardization and improvement of the teaching of statistics at the undergraduate level is a basic requirement for the solution to the problem of training statistical personnel. Specifically, it proposes that there should be developed a basic course in statistics at the freshmen level for students who will go into the natural and social sciences, standardized to the same extent as introductory courses in mathematics, physics and chemistry.

Laboratory or department of statistics

According to the Committee, one of the most puzzling problems regarding statistics is how it should be organized within a university. Two plans which are being tried out at certain universities were discussed: (1) the statistical laboratory and research center which would serve as an informal campus statistical center, and (2) the department of statistics. Plan (1) is necessarily rather informal and depends for its success on the voluntary cooperation of personnel from various departments who are interested in research and the teaching of statistics. Plan (2) would be more formal and desirable, but its success would depend on joint membership of some of its teaching personnel in other departments interested in applications of statistical methods.

Conclusions of the Committee

The Committee summarized its conclusions as follows:

1. There should be developed a basic introductory course in statistics at preferably the freshman level for colleges and universities throughout the country.
2. The laboratory work in the average course in statistics is inadequate, particularly at the elementary level; experimental work should replace much of the computation at this level.
3. The minimum requirement in effective organization is a central statistical laboratory with which all of those teaching or doing research in statistics would be associated, even though informally in some cases.
4. More success is to be expected from a department of statistics associated with a statistical laboratory and having some members in common with other departments.
5. The number of institutions needed for giving first-class training through the graduate level are: (a) 5 to 10 in mathematical statistics, (b) 25 to 30 in varying fields of applied statistics.
6. An institution giving complete training in either mathematical or applied statistics should give some training in the other.
7. Institutional stipends for graduate students specializing in mathematical and applied statistics are inadequate.
8. In strengthening its statistical work at the advanced and research levels any given university should consider which field it can develop most effectively, so as to avoid duplication and inefficiency from a national point of view.
9. The immediate critical shortage of highly qualified teachers can be eased only by suitable training of high-grade personnel now in fields of application or mathematics.
10. An adequate number of postdoctoral fellowships in statistics should be made available.

[Continued on page 16]

Personnel Placement by Professional Societies

by LOWELL H. HATTERY
Office of Scientific Personnel, National Research Council

The supply of social scientists trained in scientific method, able to use statistical and other techniques so important in the study of modern society, is extremely short. The machinery for matching trained personnel with job demands for the optimum use of individual qualifications and abilities is haphazard, and a persistent demand falls upon professional societies to provide personnel placement services. The demand comes from both the individuals who are seeking jobs and from the employers who are seeking to fill positions. Even without any formal provision for handling requests the secretariats of the professional societies are constantly beset with requests for aid.

Placement practices vary

The response to requests for service varies sharply from one society to another. In some cases, especially among societies of relatively small membership, the officials of the secretariats make informal recommendations without setting up any system of records or procedure. Even in the larger societies this method may be used for higher level jobs.

Many societies consider the publication of directories and membership lists as contributing to the process of finding prospects for a job. One of the reasons advanced by the American Historical Association for publication of a list of dissertations in progress is that it provides a source of information for those persons looking for young men who are embarking on work in a particular field.

Some societies go a step further by publishing, in the professional journals, notices of persons seeking employment and of jobs to be filled. The American Economic Association, the National Office Management Association, and the American Association for the Advancement of Science are among a large number of professional societies which follow this practice.

An increasing number of professional societies is setting up placement desks at annual or other important meetings. The placement desk is a means of bringing together employers and prospective employees. Standard practice provides for persons seeking jobs to file a qualifications sheet at the desk. Employers review the sheets and request interviews with prospects. The American Chemical Society has operated a service of this sort successfully for several years. The American Political Science Association, the American Economic Association, and the American Institute of Physics are among societies which have provided placement desks at recent annual meetings.

Formal placement services

Several of the larger professional societies provide continuing, formal placement services, varying a great deal in method and elaborateness. Among those whose primary objective is to aid members to find jobs are the American Political Science Association, the American Chemical Society, and the engineering societies. The placement service of the American Political Science Association is maintained by the Assistant Secretary-Treasurer. There are on file in his office about 300 applications for positions. Lists of the applicants, with a brief of the qualifications, are circulated to the colleges and universities, and selected lists are sent on request. No evaluation of the applicant is made, nor is there any attempt to verify the applicant's statements concerning his qualifications. Prospective employers make direct contact with the applicants.

The American Chemical Society has a full time person assigned to the operation of a Personnel Placement Service in the office of the central secretariat in Washington. Duplicates of qualifications data submitted by an applicant are sent to six regional offices, with a set of cross-index cards, one card for each special qualification. The regional office system makes it possible for many employers to have access to complete files, which would be impossible if they were located in one place. Despite the large membership of the American Chemical Society, only 300 to 400 persons are carried in the active files of the placement service. Officials believe this small number is due to rapid turnover. There is *no* "dead wood," according to an article in the Chemical Society *Journal:*

> No record can be more than three months out of date because every registrant is circularized after

Adapted from a report: *Practices in Collection and Maintenance of Information on Highly Trained and Specialized Personnel in the United States,* Report to the Conference Board of the Associated Research Councils, National Research Council, March 1, 1947.

that interval to ascertain whether or not he wishes to continue his registration, and if so, to indicate any changes that should be made in his record. Failure to respond is cause for removal of vitae.

In order to alert prospective employers to the service, four thousand letters were sent recently to employers of chemists, inviting them to use the service.

Financing engineer placement

The engineering societies found that the demand for help by job-seekers and employers was so heavy, that they established a non-profit organization known as the Engineering Societies Personnel Service, Inc. The Service operates under the direction of the American Society of Civil Engineers, American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Institute of Mining and Metallurgical Engineers. The Service maintains four offices, located in New York, Detroit, Chicago, and San Francisco. It is financed by a fee levied on the applicant and based on the salary of the job accepted, with a slightly reduced rate for members. Additional revenue is received from subscriptions to a weekly bulletin describing positions which are open. The positions are indexed by a symbol and applicants must submit requests for consideration to the Service, which screens them before forwarding qualifications data to the employer.

The American Management Association provides a very simple placement service in which the primary objective is to fill jobs rather than to find jobs for those seeking employment. The service is maintained to satisfy requests from companies which have job vacancies. The employer submits a job title and job description to the AMA office which is circulated to about 1,000 members of the American Management Association who wish to receive it.

The Personnel Exchange of the Public Administration Clearing House, which also has as its primary objective service to employers, has built up a file of 4,000 persons qualified in public management. Of the total, more than 1,700 are in the active file as good potential prospects for jobs. The active files are cross-indexed according to the following classifications: beginners, general administration, governmental research, social research, finance, public welfare, law, editing and public relations, statistics, teaching, political science, personnel, planning, housing, engineering, and school administration. These categories are set up to be most useful in serving the twenty public administration professional societies which are housed in the same building with the Exchange, and include such organizations as the International City Managers Association, the Society of Planning Officials, the American Conference of Mayors, etc. Notices of job vacancies often come into the headquarters of the professional society. These requests are then referred to the Personnel Exchange.

During 1946 about 600 vacancies were registered with the Personnel Exchange of the Public Administration Clearing House, of which about 40% represented jobs paying over $5,000 per year. The greatest shortage in relation to demand during the past year was for municipal engineers, municipal planners, and city managers.

The American Library Association also is attempting to register as many as possible of the qualified librarians of the country, in order that the Association may be able to provide the names of qualified persons for any job vacancies which may be registered with the Placement Service. In addition to the data on those seeking employment, the director of the placement service has collected information on about 40,000 persons, from personnel notes in journals and elsewhere. Complete files of information, however, exist only for those who have applied for employment, which are estimated at between 5,000 and 10,000. The files of the service have grown to such volume and the labor of searching and collecting has become so great that officials of the ALA plan to install a punch card machine system for recording and processing of qualifications information for all members.

Basic problems of maintenance

Professional societies in attempting to provide effective placement service are beset with three problems which seem to be especially acute. The first is that of *financing*. The paper work involved in reviewing applications, maintaining files, matching applicant to vacancy—all are time-consuming activities which require competent personnel. The cost is a burden on the societies which are already faced with insufficient income to provide minimum services. Most societies are not so fortunate as to have liberal endowments or income above membership dues. By the incorporation of a non-profit service which charges fees for placement, the engineering societies have set an example which is well worth the consideration of other societies or groups of societies. Job applicants, when assured of qualified service, are willing to pay placement fees.

A second major problem is that of *keeping qualifications data up-to-date*. Unless personnel files are up-to-date as to qualifications and availability it is impossible to provide a satisfactory placement service. They can be kept up-to-date only by the vigilant exercise of methods of follow-up such as those used by the American Chemical Society and the Public Administration Clearing House. The follow-up may be time-

[Continued on page 13]

QUESTIONS and ANSWERS

edited by FREDERICK MOSTELLER
Harvard University

EQUALITY OF MARGINS

Question 1. In comparing test-retest results on the same dichotomous question using the same individuals I get tables like the following:

	After		
	Yes	No	Total
Yes	83	34	117
Before			
No	26	157	183
Total	109	191	300

	After		
	Yes	No	Total
Yes	A	B	$A+B$
Before			
No	C	D	$C+D$
Total	$A+C$	$B+D$	$A+B+C+D$

I wish to test whether it is reasonable that the Before-After margins came from the same population. A chi-square test of the equality of the two total percentages of "Yesses" gives $\chi^2 = .455$, $P = .50$. But this test does not take account of the strong association between Before-After responses. How can the results be adjusted to compensate for this?

Answer. Quinn McNemar recently handled this question in *Psychometrika*. The real question is whether it is reasonable that the number of Yes-No responses is equal to the number of No-Yes responses. McNemar's solution is to use chi-square as $(B-C)^2/(B+C)$ from the lettered table above with one degree of freedom. For your table this gives $\chi^2 = 64/60 = 1.07$, $P = .30$. Naturally the agreement is not quite as good when we take out the effect of the association.

It might be pointed out that this formula is particularly easy to compute mentally. Furthermore the result is equivalent to testing whether a sample of size $B+C$ came from a binomial population (categories: Yes-No and No-Yes), with $p = \frac{1}{2}$. Consequently if there are a number of such questions it might be useful to plot B against C on Binomial Probability Paper and examine the distribution about the line $p = \frac{1}{2}$.

The most common error made when dealing with this question is to set up the marginal totals as follows:

	Yes	No	Total
Before	117	183	300
After	109	191	300

Then a chi-square test is often applied to the 2×2 table to test whether the probability of a Yes-Before is the same as the probability of a Yes-After. But the usual chi-square test requires two independent samples which the questioner rightly notices he does not have, since his respondents were not sent to a mental laundry to have their old ideas washed out and new ones added in a random manner.

QUALITY CONTROL REFERENCES

Question 2. Will you list some books and pamphlets dealing with the application of statistical methods to industrial problems?

Answer. The following books and pamphlets deal with statistical quality control, sampling inspection, and statistical methods in industrial experimentation; other applications of statistical methods, of interest to many industrial workers, such as business forecasting, cost functions, market research, polling and industrial product mortality are not covered. Many useful tables, and all Army, Navy, and NDRC publications are also omitted. Naturally a list such as this cannot be expected to be complete. For a more complete list see Butterbaugh below.

Wherever possible, the books and pamphlets are classified according to the nature of the contents and the amount of mathematics and statistics required for successful reading. The usual information on publisher, date, and, occasionally, price (at the time of original publication) is given; also, in most cases, in parentheses, the volume and page numbers of the JASA review(s).

A. Control Charts: pamphlets requiring no mathematics or statistics beyond the high school level.

(1) American Society for Testing Materials, *Manual on presentation of data, supplements,* 1945, Phila.: A.S.T.M., ix+73 pp., 85¢ (40: 377); (2) and (3) American Standards Association, *Guide for quality control and control chart method of analyzing data,* 1941, N. Y.: A.S.A., 15 pp., 75¢, and *Control chart method of controlling quality during production,* 1942, N. Y.: A.S.A., 41 pp., 75¢, (40: 379); (4) Armstrong and Clarke, *Statistical methods in quality control,* 1945, Lansdale, Pa.: Hunter Pressed Steel Co., 100 pp., (41: 130); (5) and (6) Dudding and Jennett, *Quality control charts,* 1942, London: British Standards Institution, 89 pp., 3s 10d, and *Quality control chart technique when manufacturing to a specification,* 1944, General Electric Co. of England, iii+74 pp., 2s 6d, also Arlington, Va.: Gryphon Press, $1.00 (40: 386); (7) Federal Products Corporation, *Federal dimension quality control primer,* 1946, Providence: Fed. Prod. Corp., 38 pp., gratis (41: 247; 41: 248); (8) Pearson, *The application of statistical methods to industrial standardization and quality control,* 1935, London: British Standards Institution, 161 pp. (31: 421), includes material on methods of sampling, hard to get but worth looking for; (9) Quality Control Panel, Birmingham (Eng.) District Production Comm., *Six lectures on quality control,* 1945, Birmingham: Ministry of Supply, 76 pp., gratis (41: 121; 41: 123); (10) Sealy, *A first guide to quality control for engineers,* 1943, London: Ministry of Supply, 38 pp., gratis (40: 403); (11) Whar-

ton, *Quality through statistics,* 2nd ed., 1946, London: Phillips Lamps Ltd., iv + 62 pp., 6s, also Highland Park, N. J.: Gryphon Press, $1.75 (1st ed. 40: 411; 2nd ed. 42: 200); (12) Working and Olds [Editors], *Quality control reports, 1–12,* 1945, Washington: Off. of Prod. Res. and Dev. (41: 116; 41: 118).

B. Control Charts: books requiring no mathematics or statistics beyond the high school level (the distinction between pamphlets and books is somewhat arbitrary).

(1) Dudley, *Examination of industrial measurements,* 1946, N. Y.: McGraw-Hill, ix + 113 pp., $2.00 (42: 312; 42: 313), several allied topics treated briefly; (2) Grant, *Statistical quality control,* 1946, N. Y.: McGraw-Hill, xii + 563 pp., $5.00 (42: 180; 42: 182), includes material on sampling inspection; (3) Rice, *Control charts in factory management,* 1947, N. Y.: Wiley, 149 pp., $2.50; (4) Wallace and others, *Lectures on statistical methods of inspecting and controlling quality,* 1944, Australian Council for Scien. and Ind. Res., 236 pp. (41: 266), includes material on sampling inspection.

C. Sampling Inspection.

(1) Dodge and Romig, *Sampling inspection tables,* 1944, N. Y.: Wiley, vi + 106 pp., $1.50 (40: 382), single and double sampling for attributes, tables and theory, some algebra and calculus required for theory; (2) Romig, *Allowable average in sampling inspection,* 1939, N. Y.: privately printed, 58 pp., sampling inspection for measurements; (3) a forthcoming book by the Statistical Research Group, Columbia University, *Sampling inspection,* N. Y.: McGraw-Hill, single, double, and sequential sampling for attributes; (4) a forthcoming monograph on *Acceptance sampling,* covering a symposium at Cleveland, to be published by the American Statistical Association. This monograph includes discussion of both attribute and measurement acceptance sampling.

D. More general publications in industrial statistics, requiring no mathematics or statistics beyond the high school level.

(1) Peach, *An introduction to industrial statistics and quality control,* 2nd ed., 1947, Raleigh, N. C.: Edwards Broughton Co., xv + 236 pp., $5.00 (1st ed. 41: 133; 2nd ed. 42: 332; 42: 333), quality control, sampling inspection, some experimentation, can be used as textbook; (2) Tippett, *Statistical methods in industry,* 1943, London, British Iron and Steel Fed., 74 pp., 2s 6d (40: 408).

E. More general publications in industrial statistics, requiring either college mathematics or statistics or both.

(1) Freeman, *Industrial statistics,* 1942, N. Y.: Wiley, ix + 178 pp., $2.50 (37: 559; 41: 406), calculus required; (2) Shewhart, *Economic control of quality of manufactured product,* 1931, N. Y.: Van Nostrand, 501 pp. (27: 215), the first and still the most significant treatise in the field, some calculus and statistics helpful; (3) Simon, *An engineer's manual of statistical methods,* 1941, N. Y.: Wiley, ix + 231 pp., $2.75, some calculus for appendices (36: 574).

F. Unclassified.

(1) Becker, Plaut, and Runge, *Anwendungen der mathematischen Statistik auf Probleme der Massenfabrikation,* 1930, Berlin: Springer, vi + 117 pp., applications in the electric lamp industry, a pioneering work, calculus and some statistics required; (2) Brownlee, *Industrial experimentation,* 1945, London; Ministry of Supply, 87 pp. (41: 125; 41: 127), experimental problems, chiefly from chemical engineering, some statistics helpful, largely analysis of variance; (3) Butterbaugh, *A bibliography of statistical quality control,* 1946, Seattle, Wash.: U. of Washington Press, viii + 114 pp., $1.50 (42: 173), a comprehensive bibliography including books, pamphlets, and articles; (4) Juran, *Management of inspection and quality control,* 1945, N. Y.: Harper, xv + 233 pp., $3.00 (40: 395); (5) Shewhart, *Statistical method from the viewpoint of quality control,* 1939, Washington: Dept. of Agri. Grad. School (35: 426), broad study of the interrelation of quality control and statistical method; (6) Statistical Research Group, Columbia University, *Sequential analysis of statistical data; applications,* 1945, N. Y.: Columbia U. Press, xxvii + 277 pp., $6.25 (41: 137; 41: 138), sequential analysis applied to sampling inspection and experimentation, no mathematics or statistics required; (7) *Proceedings of the industrial statistics conference held at M.I.T.,* 1938, N. Y.: Pitman, 315 pp., addresses by Ballison, Dodge, Freeman, Seiwell, Shewhart, Simon, Tippett, Wadsworth, Wilks, and others; (8) A forthcoming book by the Statistical Research Group, Columbia University, *Selected techniques of statistical analysis,* N. Y.: McGraw-Hill, new methods and applications to problems in production and research.

There are several other books which are closely related to industrial statistics and should be named here. They include (1) Fry, *Probability and its engineering uses,* 1928, N. Y.: Van Nostrand, xiv + 476 pp.; (2) Holmes, *An outline of probability and its uses,* 1936, Ann Arbor, Mich.: Edwards Brothers, viii + 119 pp., $1.50 (31: 622; 38: 267); (3) Lyle, *Regression analysis of production costs and factory operations,* 2nd ed., 1946, London: Oliver and Boyd, xii + 204 pp., 16s (42: 330).

Harold Freeman

PERSONNEL PLACEMENT BY PROFESSIONAL SOCIETIES continued from page 11

consuming and costly, but it is indispensable.

A third major problem facing the professional society in the operation of a placement service is *maintaining a high quality register of job applicants or referrals.* Often a major proportion of job applicants will be peripatetics or incompetents who are costly to handle and difficult to place satisfactorily. Few of the placement services now in existence are called on to place high-salaried persons. Most of the jobs filled by the Engineering Societies Personnel Service carry salaries under $5,000. Only the Public Administration Clearing House has filled many jobs in the higher brackets. Employers ask the Public Administration Clearing House to fill higher salaried jobs because of the vigorous effort made by the Clearing House to build up files of persons of oustanding qualifications, and the close liaison which the Clearing House maintains with employers.

Professional societies cannot escape the responsibility of aiding members and the profession in the most effective matching of personnel qualifications and job requirements. The planning for placement service should be a part of the total personnel planning for the profession.

CHAPTER NOTES

CONNECTICUT

State Statistics Are Current Concern of Chapter

by J. H. Watkins
Yale University

The summer doldrums of Chapter activity were somewhat lifted by the concern of Chapter officers over the recently passed Act of the state legislature providing for a State Examiner of Administrative Reports. As the Act reads, the Examiner will receive annual reports of departmental activities, edit them with regard to contents, arrangement and brevity, and cause them to be printed as a public document. Since annual reports of State departments usually contain the statistical tables and other basic material describing departmental activity, it appeared that the editing of such reports by an Examiner concerned with economy and brevity might cause the elimination of most of the valuable statistical compilations of the State.

A meeting was arranged of the newly appointed Examiner with the Chapter President and Secretary. The Examiner explained his ideas of the duties of his office: that he was primarily concerned with the building of the brief reports submitted to the Governor into one consolidated narrative containing the points of activity, budget requirements, etc., with which the Governor would be most concerned. Statistical reports would be largely left to the discretion of the department heads.

It was pointed out that this procedure contained several elements of danger. Some department heads would eliminate all statistical reports, believing that the brief report to the Governor covered their responsibility in describing the activities of their departments. The difficulty, without serious expert study, of knowing which statistical reports could safely be eliminated or curtailed was discussed. The likelihood that the Examiner would be made the "goat" for any trouble arising in this connection was also mentioned.

It was evident that the need for a State Examiner of Administrative Reports could not be limited to one man possessing only an editorial attitude toward them, but that a Statistical Examiner was also needed, one who would carefully explore the need for, and uses of, the published statistical material put out by the various State departments.

The appointment of such a Statistical Examiner was recommended to the Governor in the Chapter's report of its Committee on State Statistics in 1940, upon which no action was ever taken. The time now seems ripe for a renewed Chapter activity in restating the State needs for authoritative control of its statistical processes and reports and in bringing to the next legislature a bill to put such control into effect. It is clear that this program will constitute one of the major activities of the Connecticut Chapter during the next two years.

CENTRAL NEW JERSEY

The chapter provided a map to its members for reaching the meeting place at Fine Hall on September 22, when Maurice Kendall, Assistant Manager and Statistician of the United Kingdom Chamber of Shipping, spoke on "The Place of Mathematics in the Theory of Statistics—Is It Important?"

"This is the first meeting of the 1947–48 season under the presidency of J. Stevens Stock. . . . Your program committee will continue the policy of 'capturing' outstanding members of the profession, whenever available between tasks which bring them into this vicinity. This meeting affords you an opportunity of meeting an Englishman who normally could be known to us only through his writings.", wrote William Netschert, Jr., in announcing the meeting.

CHICAGO

1947 Committee Chairmen

Government Statisticians—Wallace P. Mors, Federal Reserve Bank of Chicago; Statistical Techniques—Kenneth Arrow, Cowles Commission; Personnel and Placement—Charles G. Wright, Federal Reserve Bank of Chicago; Publicity—De Ver Sholes, Chicago Association of Commerce and Industry; Coordination with Related Groups—Guenther Baumgart, Chicago Association of Commerce and Industry; Constitution and By-Laws—Ray Kinkaid, Illinois Bell Telephone Co., and John Reinboth, Commonwealth Edison Co.; Historian—De Ver Sholes; Correspondent—Helen Farrell, The People's Gas Light and Coke Co.; Reception—Marian Richeson, The People's Gas Light and Coke Co.; Nominating—Guenther Baumgart, Chicago Association of Commerce and Industry.

SAN FRANCISCO

"Individual Incomes and Savings Since the End of the War" was the subject of a talk by Woodlief Thomas, Director of the Division of Research and Statistics, Board of Governors, Federal Reserve Board, at the August 13 dinner meeting. Mr. Thomas discussed material obtained for the Board of Governors by the Division of Program Surveys, U. S. Department of Agriculture and the Survey Research Center of the University of Michigan. The results of the surveys made by this group in 1946 and 1947 were published in the *Federal Reserve Bulletin* in June, July and August, 1946, and June, July and August, 1947.

Mr. Thomas pointed out the substantial increases in the number and aggregate wealth of persons in middle income groups. Notwithstanding broad use of savings, liquid asset holdings have increased. Existence of this large and broadly distributed volume of liquid assets presents a serious threat to economic stability if spent freely or may provide a cushion of buying power if not used until incomes tend to decline. It is a new factor in the economic situation that must be taken into consideration in economic analysis. (EDITOR'S NOTE: Analysis of the statistics involved in these surveys appeared in the September, 1947, issue of *The Journal of the American Statistical Association* under the titles "Sampling for the 1947 Survey of Consumer Finances" by Roe Goodman, and "Contribution of Psychological Data to Economic Analysis" by George Katona.)

WASHINGTON STATISTICAL SOCIETY

The presence of many distinguished foreign delegates in Washington for the International Statistical Conferences made it possible to arrange a very interesting first meeting of the Society for 1947–48. Three foreign experts discussed, on September 22, recent statistical and economic developments in their countries. The speakers were: Mustafa Nsouli, Director, Statistical Office, Ministry of the National Economy, The Lebanon; Jan Tinbergen, Director of Central Planning Bureau, The Netherlands; and Colin Clark, Director of the Bureau of Industry, Financial Adviser to the State Treasury, Under-Secretary, Department of Labor and Industry, Queensland, Australia.

NEWS about MEMBERS

A **M. A. Adelman,** formerly with the Board of Governors, Federal Reserve System, has been awarded a fellowship by the Social Science Research Council. **Roy Ashmen,** formerly with the American Institute for Foreign Trade, is now with the School of Business, University of Kansas, Lawrence, Kansas. **Max Astrachan** has been appointed a full Professor at Antioch College.

B **Huldah Bancroft,** formerly with the School of Medicine, Western Reserve University, Cleveland, Ohio, is now with the School of Medicine, Tulane University, New Orleans, La. **W. D. Baten** is now chief, Operations Analysis Branch (A–5), Air Defense Command, Mitchell Field, New York. **Louis H. Bean** has transferred from the Bureau of the Budget to the Department of Agriculture, where he will work on special assignments for the Secretary in connection with the Agricultural Marketing Act of 1946. **S. T. Bok** has resigned as an Editor of *Statistica,* publication of the Vereeniging voor Statistiek of the Netherlands. He is succeeded by **C. A. G. Nass** of the Institut voor Praeventieve Geneeskunde of Leiden. **Carter M. Bowen,** formerly Chief, Materials and Machinery Section, Industrial and Price Division of the Bureau of Labor Statistics, has resigned to become Purchasing Analyst of the purchasing division of the Ford Motor Company in Dearborn, Michigan. **Daniel H. Brill,** formerly Chief of the Export and Import Section, Research and Indexes Division, Bureau of Labor Statistics, has joined the Staff of the Division of Research and Statistics of the Federal Reserve Board.

C **Ewan Clague** was appointed by the State Department to serve as United States Delegate to the Sixth International Conference of Labour Statisticians held in Montreal in early August. **Samuel M. Cohn,** formerly with the Office of Temporary Controls, has joined the Fiscal Division of the Bureau of the Budget. **William S. Connor** has resigned from Davidson College to become Associate Professor of Economics at the University of Kentucky. **Francis G. Cornell,** professional staff member of the Senate Committee on Labor and Public Welfare, is resigning as of September 30 to go to the University of Illinois as Professor of Education and Director of the Bureau of Research and Service in the College of Education.

D **Besse B. Day,** formerly of The Johns Hopkins University Applied Physics Laboratory, has been appointed Statistician to the Engineering Council of the Naval Engineering Experiment Station at Annapolis, Md. **Daniel B. De Lury** has left the Virginia Polytechnic Institute and the Agricultural Experiment Station in Blacksburg, Virginia, and is now with the Ontario Research Foundation of Toronto. **Robert W. DePuy** is now with the Industry Division of the Census Bureau. **Sol Dolleck** has left the War Department to join the Industry Division of the Census Bureau. **D. B. Duncan,** formerly with the Statistical Laboratory, Iowa State College, has gone to the University of Sydney, Australia.

E **John C. Eberhart** has left the Veterans Administration to become a Training Specialist in the Mental Hygiene Division of the Public Health Service.

F **Solomon Fabricant** of the National Bureau of Economic Research, has been appointed Associate Professor of Economics in New York University's School of Commerce and Economic Lecturer in the Graduate School there. **Robert N. Ford** has resigned from the Bureau of the Census to enter private industry. **Irwin Friend,** formerly Research Director for the Securities and Exchange Commission, is Chief of the Business Structure Division, Office of Business Economics, Department of Commerce, Washington, D. C. **Wilbert G. Fritz,** formerly with the War Assets Administration, has joined the Fiscal Division of the Bureau of the Budget.

G **Wilfred J. Garvin** has left the Veterans Administration to join the War Department. **Leon S. Geoffrey,** after serving as area supervisor, is now administrative officer of the Field Division, Bureau of the Census, in Washington.

H **Charles O. Hardy,** formerly staff economist of the Chicago Association of Commerce and Industry, has been appointed director of the staff of the Congressional Joint Committee on the Economic Report in Washington. **Wade J. Hartrick** has returned from a leave of absence to resume his position as Chairman of the Department of Economics and Business Administration at the College of Mines, El Paso, Texas. **Herman E. Hilleboe,** formerly Medical Director and Chief of the Tuberculosis Control Division of the U. S. Public Health Service in Bethesda, Md., is now Commissioner of Health of the New York State Health Dept.

J **Edgar N. Jaynes** has moved to Fairmont State College in West Virginia.

K **Hildegarde Kneeland** is on leave from the Bureau of the Budget to work with FAO on estimates of income and expenditures of the farm population.

L **Frank A. Lang** has been named Manager of the Department of Research of the Association of Casualty and Surety Companies. **Dickson H. Leavens** has resigned as research associate of the Cowles Commission for Research in Economics. He is continuing as managing editor of *Econometrica,* and may be addressed at 1632 Wood Avenue, Colorado Springs, Colorado. **John W. Lehman,** formerly Assistant Chief of the Prices and Cost of Living Branch of BLS, has become Clerk to the Joint Congressional Committee on the President's Economic Report. **William R. Leonard** has been designated Acting Director of the United Nations Statistical Office. **Forrest E. Linder,** formerly Assistant Chief of the National Office of Vital Statistics, is head of the Population Section of the Statistical Office of the United Nations.

M **William G. Madow,** who is at present with the University of São Paulo, Brazil, will join the staff of the Graduate Department of Mathematical Statistics at the University of North Carolina as Associate Professor in January, 1948. **Harry S. Magdoff** has resigned from the Department of Commerce to accept a position with the new Council of American Business. **Floyd C. Mann** has joined the staff of the Survey Research Center, University of Michigan. **Mary O. Marquardt** has been appointed Assistant Professor of Statistics at the College of Commerce and Finance, University of Detroit, Detroit, Michigan. **W. Parker Mauldin,** formerly Assistant Chief, Surveys Operations Section, Coordinating Service, Veterans Administration, has transferred to the Medical Research Statistics Division of the Department of Medicine and Surgery of the Veterans Administration. **F. E. McVay,** of the Agricultural Estimates Research Office in Raleigh, N. Ca., has been appointed Assistant Professor of Economics at North Carolina State College. **William B. Michael** has been appointed to the staff of the Department of Psychology, Princeton Uni-

versity, Princeton, New Jersey. **Walter Mitchell, Jr.**, until recently Vice President of the Irving Trust Company, is opening an office in New York City as a consultant on marketing problems and the research programs of trade associations. In market survey work he will be associated with the firm of Alderson & Sessions, Inc. **Felix E. Moore, Jr.**, formerly with the Veterans Administration, has joined the staff of the National Office of Vital Statistics of the Public Health Service.

P **W. Edmund Patte** has left Canadian Industries Limited where he was working as a Statistical Engineer and has accepted a position as Senior Chemist at the Ottawa Mill of the E. B. Eddy Company at Hull Province of Quebec. **Clyde William Phelps** has been appointed Professor of Economics at the University of Southern California. **Nora P. Powell,** formerly with the National Office of Vital Statistics, has joined the Statistical Office of the United Nations. **Galen B. Price** has left the BLS to join the commodity research staff of the Ford Motor Company. **Severn Provus** has returned from military duty to the Population Division of the Bureau of the Census. **Israel Putnam** has left the Bureau of Labor Statistics to become Assistant to the Rate Engineer at the Washington Gas Light Company, Washington, D. C.

R **Roderick H. Riley,** formerly Director of Research of the Office of Price Administration, has joined the staff of the National Planning Association as research economist and secretary to the Association's Joint Sub-Committee on Distribution of the Gains from Increasing Productivity. **Fred Ritchie,** formerly Chief of the General Price Research and Indexes Division of the Bureau of Labor Statistics, has joined the Price Control and Rationing Division, Economic and Scientific Section, of SCAP in Tokio. **Edward C. Roeber,** formerly with Kansas State Teachers College, Pittsburg, Kansas, has become a member of the staff of the College of Education, University of Missouri, Columbia, Mo. **Franklin W. Ryan,** who has been working in the Office of the Secretary, War Department, has returned to the Office of Business Economics in the Department of Commerce.

S **Marion M. Sandomire,** of the Bureau of Ships, Navy Department, addressed the American Society for Testing Materials at its 50th Annual Meeting this past June on "The Use of Statistical Methods in Rubber Evaluation." **Sam Shapiro,** formerly a statistician with the Veterans Administration, has joined the staff of the National Office of Vital Statistics, Public Health Service. **George A. Steiner,** formerly consultant in the Office of Business Economics of the Department of Commerce, has accepted an appointment to the faculty of the College of Commerce at the University of Illinois.

T **N. Arnold Tolles** has accepted a full professorship at the New York School for Industrial and Labor Relations at Cornell University. **Leland E. Traywick** has left Western Reserve University to join the Department of Economics at Michigan State College, East Lansing, Michigan.

W **Harry A. Walker,** formerly with the Squibb Institute, joined the Department of Pharmacology at the Emory University School of Medicine. **Charles A. Welsh,** formerly of the Department of Justice in Washington, D. C., has accepted appointment to the Department of Economics, University of Texas, Austin. **Aryness Joy Wickens** and **Faith M. Williams** have recently returned from attending the 30th Session of the International Labour Conference in Geneva. Mrs. Wickens served as Assistant Coordinator of the U. S. Government Delegation, and Miss Williams assisted Senator Elbert D. Thomas as United States spokesman on the Committee on Non-Metropolitan Territories. **W. R. Williamson,** formerly with the Social Security Administration, has become President of the Wyatt Company, Washington, D. C. **Winfred P. Wilson** has accepted the post of Assistant Professor in Mathematics at the University of Houston, Houston, Texas.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933, OF *The American Statistician*, published six times per annum at Washington, D. C., for 12 months ending October 1, 1947.

Washington, D. C., ss. Before me, a Notary Public in and for the State and county aforesaid, personally appeared Sylvia Weyl, who, having been duly sworn according to law, deposes and says that she is the Editor of *The American Statistician* and that the following is to best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication on the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Statistical Association, 1603 K Street, N. W., Washington 6, D. C.; Editor, Sylvia Weyl, 1603 K Street, N. W., Washington 6, D. C.; Managing Editor, None; Business Managers, None.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) American Statistical Association, 1603 K Street, N. W., Washington 6, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

SYLVIA WEYL, *Editor.*

Sworn to and subscribed before me this 18th day of September, 1947.

NORMAN S. SILL, *Notary Public.*

(My commission expires September 13, 1951.)

CRISIS IN STATISTICAL PERSONNEL continued from page 9

11. Arrangements should be established whereby postgraduate students, research workers, and teachers on leave would be able to obtain work experience in certain government agencies, industrial laboratories, and business research organizations.

12. To help offset the present critical shortage of qualified personnel in applied statistics, it would be desirable to promote conferences at advanced levels and short courses at the elementary level in various fields.

Laymen Don't Have Logarithmic Eyes

The Case Against the Casual Use of Semi Log Charts

by R. J. MYERS

It has become a common practice to present even the general reader with charts having a vertical logarithmic scale instead of the more familiar arithmetic scale. This type of chart, conveniently if somewhat inaccurately termed a ratio chart, is an extremely effective one if used properly and if understood by the reader: unfortunately, one or both of these conditions is often overlooked.

The presentation purpose of the semi-log chart, it is generally acknowledged, is to show relative rate of change. Such a chart might show, for example, that company A's sales had increased faster relatively than the sales of company B: it could not show graphically the magnitude of company A's sales compared with the sales of company B, because, unlike an arithmetic-scale chart, this type simply isn't designed to show that kind of picture.

Unfortunately, many lay readers do not have the training required to understand relative rate of change presentation: in fact many statistically trained persons will admit that they themselves have difficulty in making the mental switch necessary to interpret such a chart correctly. In most cases, reading a semi-log chart as though it were an arithmetic chart is merely confusing; but in many cases it is downright misleading.

If the semi-log method is used despite all dangers, the reader can be helped to understand it by the use of a properly descriptive title emphasizing the idea of relative growth.

For this reason, and although no other type of chart does precisely the same job, it is generally wise to think twice before using semi-log presentation. Usually the essence of the rate of change story can be told more successfully by other means, for example, by converting the data to simple percentage changes. The elegance of the semi-log form is thus lost of course, but since its meaning is usually lost on the general reader anyhow, almost any other method of showing relative change is a net gain.

Illegitimate Log charts are perhaps even more troublesome than the bona fide variety. These are the ones that are drawn in the semi-log manner not because there is any interest in relative rate of change but merely as a matter of "convenience". One of the most common examples of this practice is the use of a vertical log scale to "open up" a curve or portion of a curve in the lower scale ranges, or, another form of the same trick, to "hold down" a skyrocketing curve in the upper scale ranges (see chart 1). Such charts actually show relative rate of change and nothing else; if the designer thinks he is merely "improving" an amount of change comparison, he is fooling not only the reader but himself.

Sometimes the urge behind the improper use of the log scale is a legitimate one, and in such cases there are usually other procedures which will accomplish the desired end. For example, if a close-up of a flat curve is desired, to permit more accurate reading of the values, a magnified-scale insert chart can be used (see Chart 2). Another way is to use a split grid.

A second misuse of the semi-log chart is using it to "bring together" two series that differ greatly in magnitude. Here again the interest is in relative rate of change. If interest is in comparing absolute magnitudes, a straight arithmetic scale is exactly what is needed, because the fact that one curve is far above the other is precisely the point of the story (see Chart 3). If interest is solely in amplitudes or differences, a broken arithmetic scale provides a method of bringing the curves together for ready comparison. If interest is in comparison of general pattern or movement, simple index number treatment can be used, or other more refined methods of testing correlation.

To summarize: semi-log charts shouldn't be used for presentation unless primary interest is in relative rate of change. Many readers cannot manage to understand logarithmic charts, and therefore other methods, using arithmetic scales, are often more effective for presenting pictures of relative, as against absolute change.